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Matoniaceae (Pteridophyta) - a new family record for Thailand

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ABSTRACT. The fern species *Matonia pectinata* R.Br. has recently been collected in two provinces in Peninsular Thailand (Trang and Yala). These collections represent the first records for this species, the genus *Matonia* and the family Matoniaceae in Thailand. Trang is also the new northern limit of the known distributional range of *M. pectinata*.

During a plant collecting trip to the Khao Banthat Mountain Range in Trang province during 2003 a very unusual fern species, clearly absent from the pteridological literature for Thailand (see Tagawa & Iwatsuki, 1979, 1985, 1988, 1989; Boonkerd & Pollawatn, 2000), was found near the summit of Phu Pha Mek. Subsequent research revealed that this species was *Matonia pectinata* R.Br. and that another plant (specimen at BKF but its existence unpublished) had been collected in Yala province in February 2000. These two collections represent not only the first records for *M. pectinata* in Thailand but also the first records for the genus *Matonia* and the family Matoniaceae in Thailand.

Matoniaceae is a small family of primitive leptosporangiate ferns. It has a widespread and diverse fossil record (interpreted as 11 or more genera; see Holttum, 1954, 1968, Kramer, 1990, Tryon & Lugardon, 1990, Nishida et al., 1998) but, today, the family is represented by only four species in two genera that are restricted to Southeast Asia. The two genera (which differ most noticeably in their ecological preferences and frond architecture) are *Matonia* and *Phanerosorus*. *Matonia* has two species that are very similar (Kato, 1993): *M. pectinata* R.Br. known (until now) from Peninsular Malaysia, Riau Archipelago, Lingga Archipelago and Sumatra, and *M. foxworthyi* Copel., known from Borneo, the Philippines, Moluccas and New Guinea.

Kedah Peak, a mountain in the Kedah province of Peninsular Malaysia has, for many years, been accepted as the northern limit of the distributional range of *M. pectinata*. However, as a result of the discoveries reported here, the Khao Banthat Mountain Range in Trang province of Peninsular Thailand has become the new northern limit of the known distributional range of *M. pectinata*. Its discovery there and in Yala raises the interesting possibility that more Malaysian species may yet be discovered on some of the under-explored mountains of Peninsular Thailand.

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MATONIACEAE

Matoniaceae C. Presl, Gefässbündel Farrn 32, t.6. 1847 [Gefässbündel Farrn 32, t.6. 1847 was a pre-print of Abh. Königl. Böhm. Ges. Wiss. ser.5, 5(2): 340, t.6. 1848]; Diels in Engler & Prantl (eds.) Nat. Pflanzenfam. 4(194): 343–350. 1900; Bower, Ferns 2: 220–227. 1926; Copel., Gen. Fil. 172–173. 1947; Holttum, Revis. Fl. Malaya 2: 58–60. 1954 (also 2: 58–60, 2nd ed., 1968); Parris, Jermy, Camus, & Paul in Jermy, Studies on the flora of Gunung Mulu National Park, Sarawak 189. 1984; Kramer in Kubitzki, Fam. Gen. Vasc. Pl. 1: 183–185. 1990; Kato, Fl. Malesiana ser. 2, 3: 289–294. 1998.

Terrestrial or lithophytic. *Rhizome*: creeping, dorsiventral, dicyclic-solenostelic or tricyclic-solenstelic, and densely covered with shiny, pale-brown or orange-brown, multicellular, uniseriate hairs. *Fronds*: alternate on the dorsal side of the rhizome; erect or pendant; stipes slightly or very hairy at base (hairs identical to those on rhizome) but glabrous and shiny above; lamina pedate with pectinate pinnae, or alternately pinnate with pinnae consisting of resting buds or bud-derived leaflets and linear, simple or forked pinnules; veins free or only weakly anastomosing in sterile portions, usually anastomosing in soriferous portions. *Sori*: on the underside of fronds, round or elliptic, in one row on each side of costule or midrib; indusia, peltate, deciduous, thick in central portion, membranous and inrolled in marginal portion; sporangia few, large, simultaneously maturing, in 1–3 layers in a circle around receptacle; each consisting of a short thick stalk and a subglobose capsule with an incomplete oblique annulus. *Spores*: tetrahedral-globose, trilete, pale, surface granulate.

Two genera, each with very distinctive frond architecture: *Matonia* R.Br. and *Phanerosorus* Copel. Only *Matonia* is known in Thailand.

MATONIA

Matonia R.Br. in Wall., Pl. Asiat. Rar. 1: 16, t.16. 1829; Hook. & Bauer, Gen. Fil. t.43. 1840; Hook., Sp. Fil. 5: 285–286. 1864; Copel., Gen. Fil. 172. 1947; Holttum, Revis. Fl. Malaya 2: 59–60. 1954 (also 2: 59–60, 2nd ed. 1968); Parris, Jermy, Camus, & Paul in Jermy (ed.) Studies on the flora of Gunung Mulu National Park, Sarawak 190. 1984; Kramer in Kubitzki, Fam. Gen. Vasc. Pl. 1: 183–185. 1990; Kato, Blumea 38(1): 167–172. 1993; Kato, Fl. Malesiana ser. 2, 3: 290–292. 1998. Type species: *Matonia pectinata* R.Br.

Terrestrial. *Rhizome*: creeping, dorsiventral, tricyclic-solenostelic, densely covered with shiny, orange-brown, multicellular, uniseriate hairs. *Fronds*: alternate in two rows on the dorsal side of the rhizome; erect, stipe brown or chestnut-brown, hairy at base but glabrous and shiny above, much longer than lamina; lamina perpendicular to stipe (umbrella-like), pedate, symmetrical, consisting of a central pinna and, on each side of that, an equal number (5–13) of progressively shorter pinnae; pinnae pectinate, deeply lobed, linear, coriaceous; costae glabrous on top, glabrous or hairy underneath; pinna segments linear-oblong and obtuse or narrowly deltoid and acute, entire, with revolute margins, shiny on top, often glaucous and papillate underneath; veins forming costal areoles, forked, free or

only weakly anastomosing in sterile portions of segments, always anastomosing in soriferous portions (sori centred on small circular veins fed by 5–9 radial veinlets). *Sori*: on the underside of fronds, round, usually 0–3 per segment (but occasionally 4 or 5), often distributed with a bias towards the basiscopic sides of segments; indusia hemispherical, peltate, deciduous, thick in central portion and membranous and inrolled in marginal portion; sporangia 5–10 in one layer arranged in a tight circle around a prominent, persistent, receptacle; capsules subglobose-polygonal with incomplete oblique annuli. *Spores*: tetrahedral-globose, trilete, pale, surface granulate.

Two very similar species: *M. pectinata* R.Br. and *M. foxworthyi* Copel. Only *M. pectinata* is known in Thailand.

Matonia pectinata R.Br. in Wall., Pl. Asiat. Rar. 1: 16, t.16 (illustrations of the holotype). 1829; Hook. & Bauer, Gen. Fil. t.43 (illustrations of the holotype). 1840. Hook., Sp. Fil. 5: 285–286. 1864; Bedd., Ferns Brit. India 2: 186, pl. 186. 1866; Bedd., Handb. Ferns. Brit. India 19 1883; Tansley & Lulham, Ann. Bot. (Oxford) 19(76): 475–519, pl. 31–33. 1905; Copel., Sarawak Mus. J. 2(3): 388. 1917; Holttum, Revis. Fl. Malaya 2: 59–60. 1954 (also 2: 59–60, 2nd ed. 1968); Kato, Blumea 38: 167–172. 1993; Kato, Fl. Malesiana ser. 2, 3: 289–292. 1998. Type: Peninsular Malaysia, Malacca, Mt Ophir (present day Gunung Ledang, Johor), near the summit at ca.1200 m, 1815, *Farquhar* s.n. (holotype K-W, Wallich List no.184, seen on microfiche). Fig. 1.

Rhizome: 4–6 mm in diam. and densely covered with shiny orange-brown hairs, 3–3.5 mm long. *Fronds*: 1–4.5 cm apart, stipes 1–7 mm in diam. and 40–135 cm long; lamina approximately 20–50 cm diam., central pinna 15–38 cm long, 10–26 shorter lateral pinnae (i.e. an equal number (5–13), on each side of the central pinna); pinna segments up to 2 cm long and 4–7 mm broad at base, narrowly deltoid and acute and usually oblique and falcate. *Sori* and *spores* as in genus description above except that Thai specimens of *M. pectinata* have 5–8 sporangia per sorus (and most commonly 6).

Thailand.— PENINSULAR: Trang [Yan Ta Khao District, Khao Banthat Mountain Range, near summit of Phu Pha Mek, 1200 m, 7 April 2003, *D.J. Middleton, V. Chamchumroon, S. Lindsay, R. Pooma & S. Suwanachat* 1992 (A, BCU, BKF, L)]; Yala [Betong District, Sangala Khiri Mountain Range, 1520 m, 23 Feb. 2000, *C. Niyomdham, P. Puudjaa* & *S. Chonkunjana* 6082 (BKF)].

Distribution.— Peninsular Malaysia, Riau Archipelago, Lingga Archipelago and Sumatra.

Ecology.— In Thailand and Peninsular Malaysia *M. pectinata* grows only in exposed areas or in relatively open scrub on or near the tops of isolated mountains at altitudes of 750–2000 m. In the Riau and Lingga Archipelagos *M. pectinata* has also been found at sea level. *M. pectinata* is a thicket-forming fern adapted to poor sandy soils. Throughout its range, *M. pectinata* often grows with other thicket-forming ferns such as *Dipteris conjugata* Reinw., *Pteridium aquilinum* (L.) Kuhn and various *Gleichenia* and *Dicranopteris* species

(Tansley & Lulham, 1905; Parris et al., 1984). Its main associates in Thailand are *Dipteris conjugata* (see photo on page 68 of Niyomdham, 2000) and *Gleichenia microphylla* R.Br. The gametophytes of *M. pectinata* are relatively large and long-lived and, like many "primitive" fern species, can produce multiple embryos (Stokey & Atkinson, 1952).

Note.— The family and genus descriptions given above are based on specimens of Matoniaceae from throughout the family's range but the description of *Matonia pectinata* is based solely on the new Thai material. It is important to remember that this new Thai material represents only two plants and to be aware that the one in Trang province has laminae that are particularly small (20–25 cm in diam., consisting of a central pinna 15–18 cm long and 10–14 shorter lateral pinnae) and stipes that are particularly thin (1–3 mm diam.). The description of *M. pectinata* in Flora Malesiana (Kato, 1998) reports rhizomes up to 8.5 mm in diam., stipes up to 180 cm long and laminae up to approximately 75 cm in diameter. It remains to be seen whether plants this large will also be found in Thailand.

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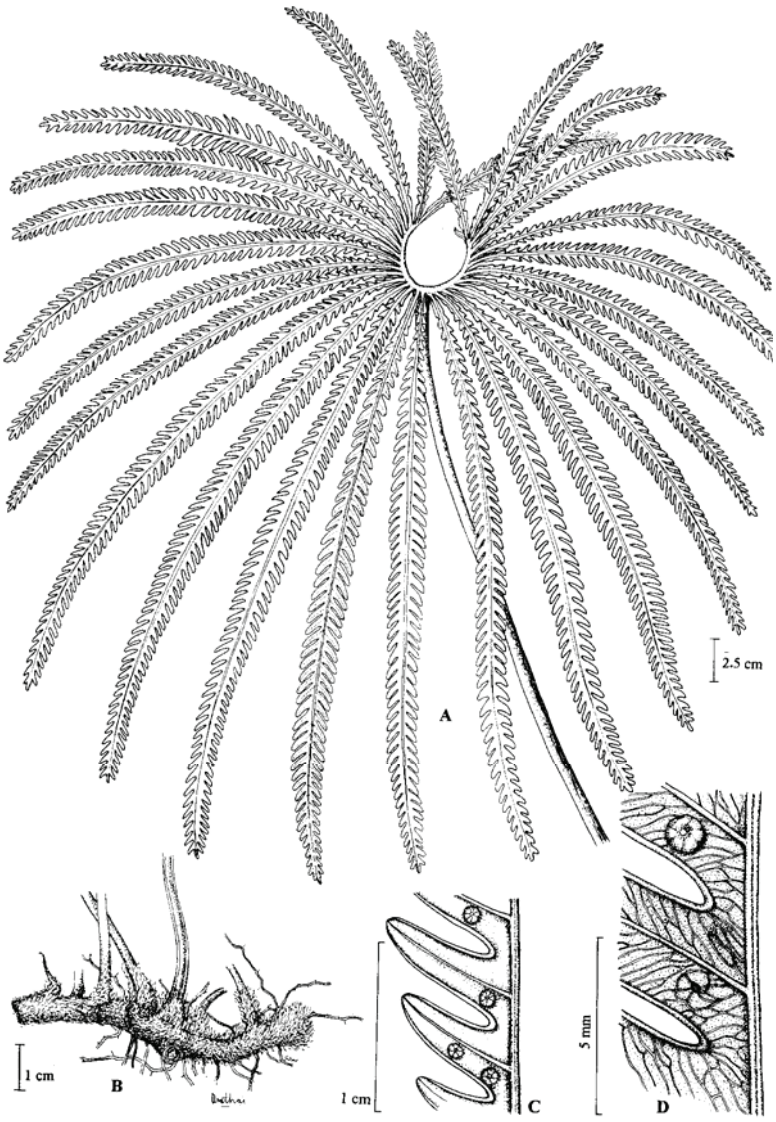

Figure 1. *Matonia pectinata* R.Br.: A. frond; B. rhizome; C. part of pinna with 4 intact sori; D. part of pinna showing the venation around one sorus (top segment) and under another (middle segment; sorus removed). A from *C. Niyomdham et al.* 6082 (BKF), B–D from *D.J. Middleton et al.* 1992 (BKF). Drawn by O. Kerdkaew.